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An annotated checklist of the Noctuoidea of Jordan with remarks on ecology, phenology and zoogeography. Part II: Cuculliinae & Oncocnemidinae (Lepidoptera: Noctuidae)

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T. Witt & G. C. Müller

Abstract

A complete list of the presently known species of Cuculliinae and Oncocnemidinae of Jordan is presented, and the biogeography, phenology and distribution of the same are discussed. Within a German - Israeli project to monitor the Lepidoptera Fauna of the Levant we recorded from 1986 to 2010 a total of eleven species of Cuculliinae and 28 species of Oncocnemidinae five of which species are new records for the country [*Cucullia celsiae* (Herrich-Schäffer, 1850), *Cucullia oberthueri* Culot, 1909, *Brachygalea kalchbergi* (Staudinger, 1897), *Cleonymia warionis* (Oberthür, 1876), *Lithophasia quadrivirgula* (Mabille, 1888)]. In Jordan the Cuculliinae are represented by one genera and the Oncocnemidinae by twelve genera. Most of the species clearly cluster within one vegetation zone. The majority of species are of an Eremic (19) and Irano-Turanian (10) distribution pattern, Mediterranean (9) and Palearctic (1) elements are uncommon. The bulk of the species is univoltine with the highest occurrence in spring from March to April and to a lesser extent in winter. Almost all the Eremic species of the Levant can be found in Jordan, while the Irano-Turanian and Mediterranean elements of the Levant are represented only by about half of the species.

KEY WORDS: Lepidoptera, Noctuidae, Cuculliinae, Oncocnemidinae, biogeography, phenology, ecology, Jordan, Levant.

Una lista comentada de los Noctuoidea de Jordania con detalles sobre ecología, fenología y zoogeografía.

**Parte II: Cuculliinae & Oncocnemidinae
(Lepidoptera: Noctuidae)**

Resumen

Se presenta una lista completa de las especies actualmente conocidas de Cuculliinae y Oncocnemidinae de Jordania y se discute la biogeografía, fenología y distribución de las mismas. Dentro del proyecto germano-israelí para el seguimiento de la fauna de Lepidoptera del Próximo Oriente, desde 1986 a 2010 registramos un total de once especies de Cuculliinae y 28 especies de Oncocnemidinae, cinco de las cuales son nuevas citas para el país [*Cucullia celsiae* (Herrich-Schäffer, 1850), *Cucullia oberthueri* Culot, 1909, *Brachygalea kalchbergi* (Staudinger, 1897), *Cleonymia warionis* (Oberthür, 1876), *Lithophasia quadrivirgula* (Mabille, 1888)]. En Jordania los Cuculliinae están representados por un género y los Oncocnemidinae por doce géneros. La mayoría de las especies tienen un modelo de distribución erémico (19) e irano-turánico (10), son elementos poco comunes los mediterráneos (9) y paleárticos (1). La mayoría de las especies son univoltinas, con una mayor frecuencia en primavera de marzo a abril y en menor medida en invierno. Casi todas las especies erémicas del Próximo Oriente pueden encontrarse en Jordania, mientras que los elementos irano-turánicos y mediterráneos, están representados aproximadamente por la mitad de las especies.

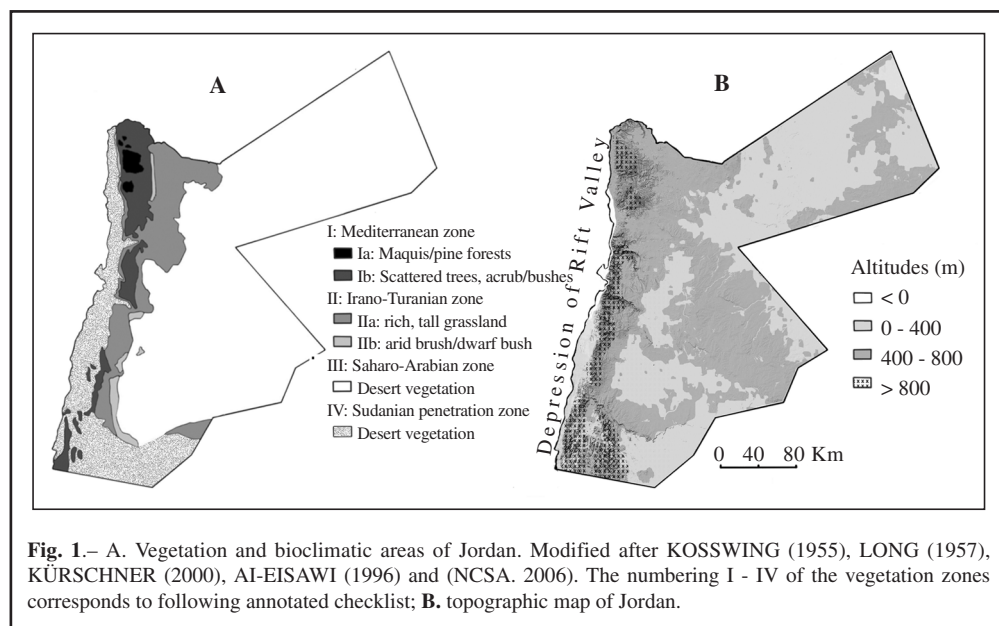
PALABRAS CLAVE: Lepidoptera, Noctuidae, Cuculliinae, Oncocnemidinae, biogeografía, fenología, ecología, Jordania, Próximo Oriente.

Introduction

Within the German-Israeli project for the study of the Middle Eastern Lepidoptera fauna we collected in Jordan for more than 20 years (1998-2010) regularly Lepidoptera. This project was and is a joint effort of the Hebrew University and Tel Aviv University in Israel and the Zoologische Staatssammlungen und Museum Witt, München in Germany (MÜLLER, *et al.*, 2006; KRAVCHENKO *et al.*, 2007a; KRAVCHENKO *et al.*, 2007b). Previous publications from HACKER *et al.* (HACKER & SCHREIER, 2001; HACKER, 2001; HACKER *et al.*, 2001) are widely based on material collected within the first ten years of this project. The last ten years we intensified our efforts and also other groups of entomologists started to explore the fauna of Jordan (FABIANO & ZILLI, 2001; STADIE & LEHMANN, 2012; KATBEH-BADER, 2013). Until today 224 species belonging to the six subfamilies Erebininae, Cuculliinae, Oncocnemidinae, Noctuinae, Xyleninae and Hadeninae, are known from Jordan. At the end of the German-Israeli project the list of recorded species from these subfamilies increased to 302 (including nine Cuculliinae and 25 Oncocnemidinae). These six subfamilies will be published in a series of 5 papers and comprise about 80% of the Jordanian Noctuid fauna (KRAVCHENKO *et al.*, 2007a; KRAVCHENKO *et al.*, 2007b). The other subfamilies and groups will be combined at a later point in a sixth paper.

Most Cuculliinae and Oncocnemidinae are xerophilous, inhabit steppes, eremic areas and/or xeromontane habitats (RONKAY & RONKAY 1994, 1995, SPEIDEL *et al.*, 1996). The species of both subfamilies are typically well attracted to ultraviolet light after midnight and accordingly well covered by the light trap survey.

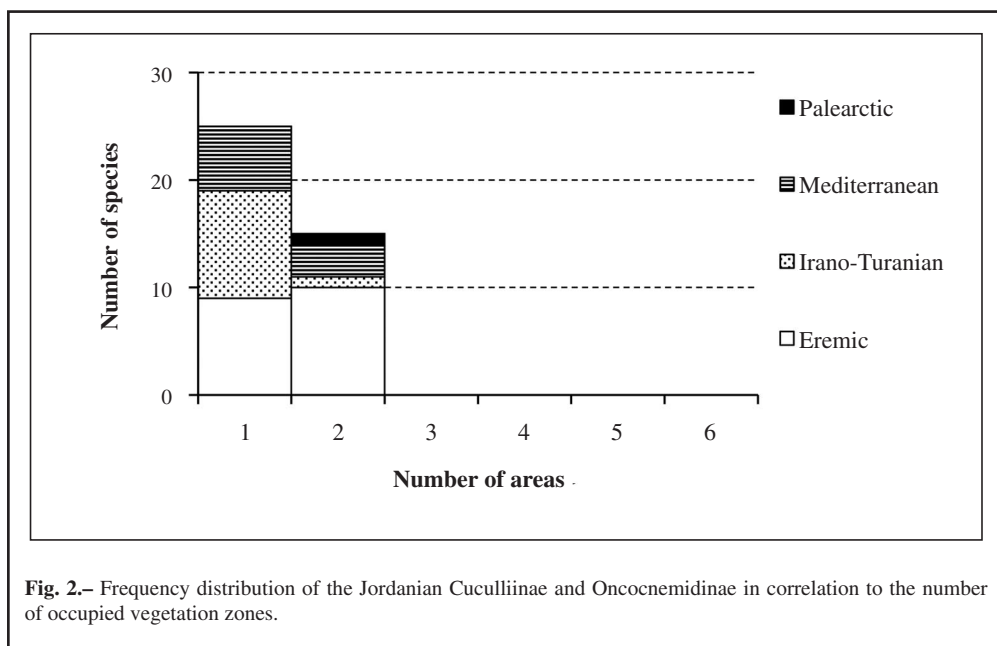
Method of collecting, climate, relief and phyto-geographic regions of Jordan were discussed in details in our manuscript published earlier (KRAVCHENKO *et al.*, 2014). Therefore, here we show only a map of vegetation areas and a topographic map.



Results and discussion

The 39 species listed in this paper represent about two thirds of the Cuculliinae and Oncocnemidinae fauna of the Levant (62 species). In Jordan almost all the Levantine Eremic elements are found (only 2 species are missing) (Fig 3). From the Irano - Turanian and Mediterranean elements only about half the Levantine species and from the five Palearctic species only one are found.

In Jordan presently 11 Cuculliinae and 28 Oncocnemidinae are known. Two Cuculliinae (*Cucullia celsiae* and *C. oberthueri*) and three Oncocnemidinae (*Brachygalea kalchbergi*, *Cucullia warionis* and *Lithophasia quadrivirgula*) are new records for the country. The majority of the 39 species are Eremic (19), Irano-Turanian (10) and Mediterranean (9). Only one of the species (*Cucullia verbasci*) is widely distributed in the Palearctic while tropical elements are absent.



Most Jordanian Cuculliinae and Oncocnemidinae (24) inhabit only one vegetation zone (Figs. 1-2), 15 were found in two and none in three. Only three *Cucullia* (*C. improba*, *C. macara* and *C. syrtana*) are truly eremic and are restricted to the deserts of Jordan while the other species are found in the Mediterranean and Irano-Turanian Zones. Of the 28 Oncocnemidinae fifteen species are restricted to arid habitats, including the Irano-Turanian, Saharo-Arabian and Sudanian Penetration Zones. This group is mainly composed of species of genera *Metopoceras* and *Cleonymia*. Typical Mediterranean species (species of the genera *Stilbia*, *Omphalophana*, *Metalopha* and *Calophasia platyptera*, *C. baetica*, *C. opposita*) are found in the maquis, natural pine forests and open oak dominated park forests in the hills of northern Jordan and along the northern part of the western Mountain Range (Fig. 1).

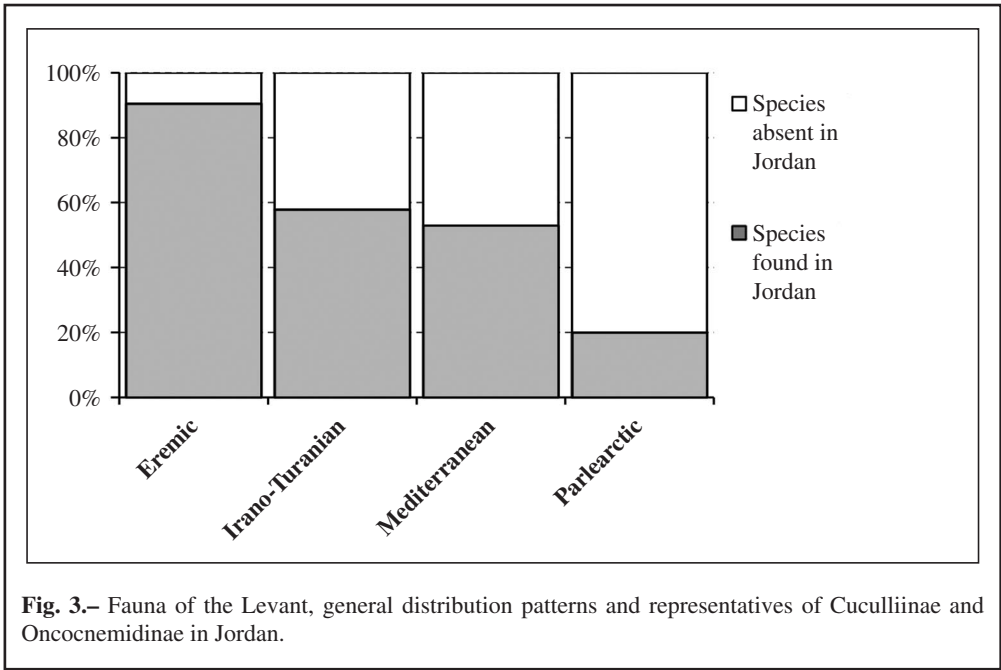


Table 2.– Phenology of the Jordanian Cuculliinae and Oncocnemidinae. Number of species flying per month.

Month	Uni-voltine	Multi-voltine
January	4	
February	3	
March	23	
April	7	1
May		
June		
July		
August		
September		
October		1
November		
December	4	

Apart from specific habitat preferences the Cuculliinae and Oncocnemidinae also display highly specific seasonal flight patterns (Table 2). Most species are uni-voltine with the highest rate of occurrence of the adults in spring from March to April. Only one species *Calophasia platyptera* is bi-voltine, flying twice, in April and later again in October.

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Table 1.— Annotated Check List of the Cuculliinae and Oncocnemidinae and their distribution in the main vegetation zones of Jordan. Main vegetation Zones: **I.** Mediterranean Zone, **Ia.** Maquis /pine forests, **Ib.** Park forests, scattered trees, scrub / bushes; **II.** Irano-Turanian Zone, **IIa.** Rich, tall grassland; **IIb.** Arid brush / dwarf bush communities; **III:** Saharo-Arabian Zone; **IV.** Sudanian Penetration Zone. Principal distribution of species: X; New records for Jordan: N

SPECIES	N	Vegetation Zones					
		Ia	Ib	IIa	IIb	III	IV
CUCULLIINAE	Ia	Ib	IIa	IIb	III	IV	
1. <i>Cucullia calendulae</i> Treitschke, 1835		X	X				
2. <i>Cucullia celsiae</i> (Herrich-Schäffer, 1850)	N	X					
3. <i>Cucullia improba</i> Christoph, 1885							X
4. <i>Cucullia macara</i> Rebel, 1948						X	X
5. <i>Cucullia santolinae</i> Rambur, 1834			X	X			
6. <i>Cucullia syrtana</i> (Mabille, 1888)						X	X
7. <i>Cucullia barthae</i> (Boursin, 1933)		X					
8. <i>Cucullia blattariae</i> (Esper, 1790)			X	X			
9. <i>Cucullia verbasci</i> (Linnaeus, 1758)		X	X				
10. <i>Cucullia hemidiaphana efflatouni</i> Wiltshire, 1948					X		
11. <i>Cucullia oberthueri</i> Culot, 1909	N						X
ONCOCNEMIDINAE							
12. <i>Brachygalea albolineata</i> (Blachier, 1905)						X	X
13. <i>Brachygalea kalchbergi</i> (Staudinger, 1897)	N	X					
14. <i>Calophasia angularis</i> (Chrétien, 1911)					X		X
15. <i>Calophasia platyptera</i> (Esper, 1788)		X	X				
16. <i>Pamparama sinaica</i> (Wiltshire, 1948)							X
17. <i>Cleonymia baetica</i> (Rambur, 1837)		X					
18. <i>Cleonymia chabordis</i> (Oberthür, 1876)						X	X
19. <i>Cleonymia fatima</i> (A. Bang-Haas, 1907)					X		
20. <i>Cleonymia jubata</i> (Oberthür, 1890)						X	X
21. <i>Cleonymia opposita</i> (Lederer, 1870)		X					
22. <i>Cleonymia pectinicornis</i> (Staudinger, 1859)				X			
23. <i>Cleonymia warionis</i> (Oberthür, 1876)	N				X		
24. <i>Hypeuthina fulgurita</i> Lederer, 1855		X					
25. <i>Lithophasia quadrivirgula</i> (Mabille, 1888)	N			X	X		
26. <i>Metalopha gloriosa ingloria</i> Draudt, 1933		X					
27. <i>Metalopha liturata</i> (Christoph, 1887)		X					
28. <i>Metopoceras delicata</i> (Staudinger, 1898)					X	X	
29. <i>Metopoceras kneuckeri</i> (Rebel, 1903)					X		
30. <i>Metopoceras omar</i> (Oberthür, 1887)						X	X
31. <i>Metopoceras philbyi</i> Wiltshire, 1980							X
32. <i>Metopoceras solituda</i> (Brandt, 1938)							X
33. <i>Omphalophana antirrhinii</i> (Hübner, [1803])		X					
34. <i>Omphalophana pauli</i> (Staudinger, 1892)		X					
35. <i>Pamparama acuta</i> (Freyer, 1838)			X				
36. <i>Rhabinopteryx subtilis</i> (Mabille, 1888)				X	X		
37. <i>Stilbia syriaca</i> Staudinger, 1892		X					
38. <i>Stilbina hypaenides</i> Staudinger, 1892		X					
39. <i>Teinoptera culminifera</i> Calberla, 1891							X